

In response, Applicant has submitted herewith a revised drawing sheet for Fig. 1 with identification of the specified elements.

Accordingly, in view of the foregoing, Applicant
5 respectfully submits that the drawing objection has now been overcome and respectfully requests withdrawal thereof.

Applicant has amended Claims 1, 13, 19, 24 and 29 to more particularly describe the invention. These amendments are fully supported by the original disclosure, and, accordingly, no new
10 matter is hereby being introduced. Support may be found, for example, in Fig. 1 and in the specification at Page 5, lines 2-5 and Page 12, lines 20 et seq.

Applicant has added new Claims 30-43.

Applicant believes that these newly added claims are fully
15 supported by the original disclosure, and, accordingly, no new matter is hereby being introduced. Support may be found, for example, in Fig. 1 and in the specification at Page 7, lines 1-2 and Page 11, lines 4-8.

Regarding the merits of the Office Action, as discussed
20 further below, the various rejections under 35 U.S.C. §102(e) and 35 U.S.C. §103(a) rely upon U.S. Patent No. 6,209,400 to Schoch et al. as the primary reference.

Applicant has amended the specification to assert status of the instant application as a continuation-in-part of prior

compending application Serial No. 08/957,047 that matured into
U.S. Patent No. 6,209,400, with further recitation of a claim to
benefit thereof under 35 U.S.C. §120.

Applicant notes that submission of this reference to prior
5 compending application Serial No. 08/957,047 is timely and in full
compliance with the requirements set forth in 35 U.S.C. §120 and
37 C.F.R. §1.78 (cf MPEP §201.08 and MPEP §201.11(E)).

Accordingly, Applicant respectfully submits that U.S. Patent
No. 6,209,400 is no longer available as a reference under the
10 statutory provision cited by the Examiner.

In view of the foregoing, Applicant respectfully requests
withdrawal of all rejections pertaining to Claims 1-29.

STATEMENT OF COMMON OWNERSHIP

Applicant hereby states that the instant Application Serial
15 No. 09/487,688 and U.S. Patent No. 6,209,400 were, at the time
the invention of Application Serial No. 09/487,688 was made,
owned by, or subject to an obligation of assignment to, The
Minster Machine Company of Minster, Ohio, U.S.A.

Accordingly, in view of this foregoing statement, Applicant
20 respectfully submits that U.S. Patent No. 6,209,400 has hereby
been disqualified as prior art vis-à-vis rejections under 35
U.S.C. §103, pursuant to 35 U.S.C. §103(c) (cf MPEP §706.02(1)(1)
and (2)(II)).

In view of the foregoing, Applicant respectfully requests withdrawal of the rejections under 35 U.S.C. §103(a) pertaining to Claims 13-15 and 24, and Claims 16, 25 and 26.

Notwithstanding the above, Applicant proceeds below with a response on the merits addressing the rejections set forth in the Office Action.

Claims 1-12, 17-23 and 27-29 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,209,400 to Schoch et al. (the Schoch '400 patent).

Claims 1, 19 and 29 are independent.

As indicated above, Claims 1, 19 and 29 have been amended to recite a control-related limitation.

Applicant respectfully submits that the Schoch '400 patent neither teaches nor discloses any control feature relating to control of the press machine using vibration activity information.

Accordingly, in view of the foregoing, Applicant respectfully submits that base Claims 1, 19 and 29 and Claims 2-12, 17-18, 20-23 and 27-28 dependent therefrom are patentably distinguishable over the Schoch '400 patent and respectfully requests withdrawal of this rejection.

Claims 13-15 and 24 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the Schoch '400 patent in view of U.S. Patent No. 5,602,757 to Haseley et al.

Applicant respectfully submits that Claims 13-15 and 24 are patentable over the Schoch '400 patent in view of Haseley et al. because they depend in relevant manner from patentably distinguishable base Claims 1 and 19, as indicated *supra*.

5 Accordingly, Applicant respectfully requests withdrawal of this rejection.

Claims 16, 25 and 26 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the Schoch '400 patent in view of U.S. Patent No. 5,094,107 to Schoch (the Schoch '107 patent).

10 Applicant respectfully submits that Claims 16, 25 and 26 are patentable over the Schoch '400 patent in view of the Schoch '107 patent because they depend in relevant manner from patentably distinguishable base Claims 1 and 19, as indicated *supra*.

15 Accordingly, Applicant respectfully requests withdrawal of this rejection.

Applicant acknowledges the Examiner's indication that the prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

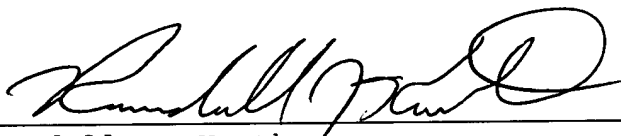
20 Applicant submits herewith a check in the amount of Four Hundred Fifty-Two Dollars (\$452) which covers the Extension of Time Fee of Two Hundred Dollars (\$200) Required by 37 C.F.R. 1.17, the fee for the additional claims in excess of twenty of One Hundred Twenty-Six Dollars (\$126), and the fee for the additional extra independent claim fee of One Hundred Twenty-Six

Dollars (\$126). Applicant hereby claims small entity status. A reduction of ½ for filing by small entity (see 37 CFR 1.27). Further, The Commissioner is hereby authorized to charge any additional fees which may be required and credit any overpayments to:

RANDALL J. KNUTH, P.C. - Account Number 501157

If the Examiner has any questions or comments that would advance prosecution of this case, the Examiner is invited to call the undersigned at 260/485-6001.

Respectfully submitted,


Randall J. Knuth
Registration No. 34,644

RJK/td2

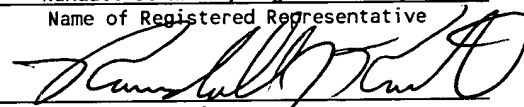
Encs:

Marked-Up Specification
Marked-Up Claims
Replacement Specification
Replacement Claims
Replacement Drawing
Petition for Extension of
Time
Check #6006 (\$452)
Return Postcard

RANDALL J. KNUTH, P.C.
3510-A Stellohorn Road
Fort Wayne, IN 46815-4631
Telephone: 260/485-6001
Facsimile: 260/486-2794

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Hon. Commissioner of Patents and Trademarks, Washington, D.C. 20231, on: April 1, 2002.

Randall J. Knuth, Regis. No. 34,644
Name of Registered Representative

Signature
April 1, 2002
Date

CONSOLE MOUNTED VIBRATION SEVERITY MONITOR

This application claims benefit under 35 U.S.C. § 120 as a continuation-in-part of U.S. Patent Application Serial No. 08/957,047 filed October 24, 1997 and which issued as U.S. Patent No. 6,209,400 on April 3, 2001.

BACKGROUND OF THE INVENTION

1. Field of the invention.

The present invention relates generally to press vibration monitoring and more particularly, to a method of generating a press load/speed vibration severity condition indicator for the determination of press/die long-term operating reliability during production operation and to an apparatus utilizing the information generated by the above method in monitoring press vibration severity.

2. Description of the related art.

The traditional method for calculating the tonnage of a press die is mainly by a means of static load calculation. A given die has a certain material shear length and a stock material with a certain thickness. From this, the tonnage of the die or the force necessary to shear or form the part may be calculated. Traditional press sizing has been based on "static" die shear loading as calculated using the equation; [Shear Length (in.)] [Thickness (in.)] [S. (lb/in²)] = Shear Load (lb).

This load (plus forming and blanking static loads) has traditionally been considered the only significant load and thus



MARKED-UP CLAIMS

WHAT IS CLAIMED IS:

Please amend claim 1 as follows:

1. A device for monitoring the operation of a mechanical press, comprising:

an at least one signal generator;

a signal conditioner operatively connected to said at least one signal generator, for calculating a value from said at least one generated signal; [and]

a display operatively connected to said signal conditioner[.]; and

a control unit configured to selectably control said mechanical press in accordance with signals from said signal conditioner and/or said display.

2. The device of Claim 1, wherein said at least one signal generator is an accelerometer.

3. The device of Claim 2, wherein said accelerometer monitors press conditions and creates a corresponding signal.

4. The device of Claim 1, wherein said at least one signal generator is attached to the press.

5. The device of Claim 1, wherein said value from said signal conditioner is one selected from the group including: press displacement, press velocity, and press acceleration.

MARKED-UP CLAIMS

6. The device of Claim 1, wherein said signal conditioner further conditions said calculated value by a peak to peak detector.

7. The device of Claim 1, wherein said signal conditioner further conditions said calculated value with an RMS to DC voltage converter.

8. The device of Claim 1, wherein said display includes a volt meter for displaying said calculated value.

9. The device of Claim 1, wherein said display includes an at least one LED for indicating a vibration severity zone, said vibration severity zone indicating a range for said calculated value.

10. The device of Claim 9, wherein said vibration severity zone is characterized by one selected from the group including: extreme long-term reliability of the press; very good long-term reliability of the press; reliable conditions under caution; and conditions that are not advisable for long-term reliability.

11. The device of Claim 1, further comprising a switch.

12. The device of Claim 11, wherein said switch allows user selection of said calculated value for said display.

MARKED-UP CLAIMS

Please amend claim 13 as follows:

13. The device of Claim 1, wherein said control unit further comprising a press machine controller for controlling press functions in response to said calculated values from said signal conditioner.

14. The device of Claim 13, wherein said press machine controller includes a programmable logic controller.

15. The device of Claim 13, wherein said press machine controller calculates at least one selected from the group comprising: vibration severity versus time, percent of time within a particular vibration severity zone, total time of press operation in a zone, quantity of alarms, time of alarms with
5 respect to operation times, percent of operation time versus non-operation time, and percentage of quantity produced versus time fluctuation and quantity of stops.

16. The device of Claim 1, further comprising an alarm signal generator for signaling undesirable operating conditions.

17. The device of Claim 1, further comprising a data storage device for selectively storing digitized output.

18. The device of Claim 1, further comprising a modem for transmitting said calculated values to a remote location.

MARKED-UP CLAIMS

Please amend claim 19 as follows:

19. A device attachable to a mechanical press for measuring press conditions, said device comprising:

an at least one accelerometer for measuring press conditions and creating a corresponding signal;

5 a signal processing means for processing said corresponding signal, said signal processing means connected to said at least one accelerometer to process said corresponding signal, said signal processing means comprising:

10 an acceleration processing means for calculating a press acceleration value;

a velocity processing means for calculating a press velocity value; [and]

a displacement processing means for calculating a press displacement value;

15 a display means for displaying at least one of said calculated values; [and]

a switch permitting an operator to select one of said calculated values for input to said display means[.]; and

20 a control unit configured to selectably control said mechanical press in accordance with signals from said signal processing means and/or said display means.

MARKED-UP CLAIMS

20. The device of Claim 19, wherein said display means further displays a vibration severity zone characteristic.

21. The device of Claim 20, wherein said vibration severity zone characteristic is an LED indicator representing the operating conditions of the press.

22. The device of Claim 20, wherein said vibration severity zone characteristic is one selected from the group including: extreme long-term reliability of the press, very good long-term reliability of the press, reliable conditions provided there is cautious operation, and conditions that are not advisable for long-term reliability.

23. The device of Claim 19, wherein said accelerometer measures press conditions during operation of the press.

Please amend claim 24 as follows:

24. The device of Claim 19, wherein said control unit further comprising a press machine controller for controlling press functions in response to said calculated values.

25. The device of Claim 19, further comprising an alarm signal generator for signaling undesirable press operating conditions.

26. The device of Claim 25, wherein said alarm signal generator generates a signal in at least one method selected from

MARKED-UP CLAIMS

the group including: lighting a light at the press machine,
paging a selected individual, forwarding the signal to a remote
5 location, forwarding a prerecorded message to a preselected phone
number, and forwarding an electronic message to a remote
location.

27. The device of Claim 19, further comprising a data
storage device for selectively storing at least one of said
calculated values and measured conditions.

28. The device of Claim 19, further comprising a modem for
transmitting said calculated values to a remote location.

Please amend claim 29 as follows:

29. A method of monitoring the long-term reliability of a
mechanical press, comprising:

generating a unique press vibration severity/reliability
zone chart;

5 monitoring the vibration severity of the press; [and]
outputting the monitored vibration severity and the
corresponding vibration severity/reliability zone[.]; and
selectably controlling said mechanical press in accordance
with the monitored vibration severity.

MARKED-UP CLAIMS

Please add new Claims 30-43 as follows:

30. A system in combination with a press machine and a press machine sensor assembly, said system comprising:

a press machine vibration monitoring apparatus, said vibration monitoring apparatus being operatively coupled to said
5 press machine sensor assembly, said vibration monitoring apparatus comprising:

a processor to process sensor signals generated by said sensor assembly; and

a controller being operatively coupled to said processor,
10 said controller being configured to selectably control said press machine.

31. The system as recited in Claim 30, wherein said controller being configured further to control said press machine in accordance with processed sensor signals received from said processor.

32. The system as recited in Claim 30, wherein said processor being configured to generate relative to said press machine at least one of an acceleration measurement, a velocity measurement, and a displacement measurement.

33. The system as recited in Claim 30, wherein said sensor assembly includes at least one accelerometer.

MARKED-UP CLAIMS

34. The system as recited in Claim 30, further includes a display operatively coupled to said processor.

35. The system as recited in Claim 30, wherein said vibration monitoring apparatus defining a built-in element of said press machine.

36. An apparatus in combination with a press machine and a press machine sensor assembly, said apparatus comprising:

a press machine vibration measurement device operatively coupled to said sensor assembly; and

5 a press machine controller operatively coupled to said press machine vibration measurement device.

37. The apparatus as recited in Claim 36, wherein said vibration measurement device further comprises a press acceleration determination unit, a press velocity determination unit, and/or a press displacement determination unit.

38. The apparatus as recited in Claim 36, further comprises:

a display operatively coupled to said press machine vibration measurement device and/or said press machine controller.

39. The apparatus as recited in Claim 36, wherein said apparatus having a built-in configuration relative to said press machine.

MARKED-UP CLAIMS

40. A method in combination with a press machine, said method comprising the steps of:

sensing and measuring vibration activity in said press machine; and

5 selectably controlling press machine operation in accordance with the vibration activity measurement.

41. The method as recited in Claim 40, further comprises the step of:

providing a built-in press machine vibration monitoring device configured to perform the vibration activity measurement
5 and/or the press machine operation control.

42. The method as recited in Claim 40, further comprises the step of:

displaying the vibration activity measurement and/or a representation thereof.

43. The method as recited in Claim 40, further comprises the step of:

performing at least one of an alarm notification task, a vibration-related data storage task, a diagnostic task, and/or a
5 remote vibration-related data communication task, using the vibration activity measurement.